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## AVIATION CONSUMER

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## FIRST WORD

### WHITE LIGHTNING RV-14: UNLEADED AVGAS POSTER CHILD

While he's not a climate zealot, Jonathan Sisk admittedly supports responsible ecology by not emitting any amount of toxic lead into the atmosphere from the exhaust of his newly completed Van's RV-14 "White Lightning" kit aircraft. It's equipped with a 215-HP Lycoming Y10-390-EXP and before completing the Van's kit, he did something that he strongly feels more kit builders should do and that's add GAMI's G100UL high-octane unleaded avgas to the aircraft's fuel limitations section of the aircraft's flight manual. Operators of certified aircraft can add G100UL to the aircraft's operating limitations via STC, too, which is approved for every spark ignition piston engine and every airframe using a spark ignition piston engine in the FAA's Type Certificate database.

Like any other STC modification process that has been around for years and years, GAMI's FAA-awarded AML (Approved Model List) STC in 2022 followed a well-established FAA method to provide expansion of the applicable makes and models of aircraft and engines to use the fuel. Purchase the STC (pricing is based on engine model and horsepower rating) and you get a short Approved Flight Manual Supplement (AFMS) and G100UL placards to be installed around the fuel filler ports on the aircraft, plus one for the engine. There is a short set of routine ICAs (Instructions for Continued Airworthiness) and Installation Instructions for the placards. It's that straightforward.

Sisk was convinced early on that G100UL would run just fine in his engine—regardless of STC approval. GAMI said that early in the development of G100UL avgas, engine makers sent engineers to GAMI headquarters in Oklahoma, who evaluated G100UL avgas and flew a turbocharged Cirrus operating on G100UL avgas in one wing tank and 100LL in the other. GAMI said there was no objection raised by either of those two early OEM engine manufacturers to the performance of the G100UL avgas. Moreover, Cirrus Aircraft had one of its senior managers come to GAMI and fly the G100UL avgas in a Cirrus aircraft to evaluate its performance against 100LL. According to GAMI in a presentation at Sun n' Fun last spring, the engine performed as good or better than it did on 100LL. G100UL is currently the only avgas to have an FAA-approved commercial production specification.

Sisk pointed out that avgas is the only remaining commercial fuel to contain tetraethyl lead (TEL) to boost octane for aviation piston engines. Lead in automobile gasoline has been outlawed since 1993. And, eliminating the tetraethyl lead octane booster from avgas also has practical operational benefits such as longer oil change intervals and reduced maintenance from not polluting the inside of the engine with lead deposits.

"If the White Lightning RV-14 can play some small role to increase public awareness and pilot confidence that an unleaded avgas solution will be found, then that is most gratifying," Sisk told me. Have you purchased a G100UL STC or added the fuel to your experimental ops spec? We'd like to hear from you for an upcoming alternative fuel report. —Larry Anglisano



# GAMI G100UL Avgas Flight Trial

*How does a 215-HP Lycoming run on GAMI's unleaded avgas? We loaded some in and put it through the wringer with predictable results.*

by Jonathan Sisk

**G**AMI (General Aviation Modifications Inc.) is well known for its GAMIjector fuel nozzles, several turbonormalizing engine upgrades and, most recently, for developing the first (and so far, the only) high-octane unleaded aviation gasoline. Known as G100UL, it was approved by the FAA in 2022 to operate in all piston, spark-ignition aircraft engines and is currently the only avgas to have an FAA-approved commercial production specification.

I have been aware of GAMI's unleaded fuel development program since it began in 2009. With its 2022 FAA approval, I added G100UL to the fuel limitations section of the Airplane Flight Manual for my completed Van's RV-14 ("White Lightning") prior to its FAA inspection and licensing. To my knowledge, as the builder/manufacturer of the aircraft, I became the first to approve operation

on an unleaded 100-octane aviation gasoline. And so I made a stop at GAMI's Ada, Oklahoma, headquarters and tanked up with G100UL.

## TOP IT OFF

Before launching off on my return trip, we transferred my remaining 100LL fuel from the right tank to the left, then topped off the right tank with 25 gallons of GAMI's G100UL. The engine in my RV-14 is a 215-HP Lycoming Y10-390-EXP.

I started the trip drawing fuel from the right fuel tank, burning the unleaded G100UL avgas. After taking off and a high-speed low pass for the cameras, I was on my way, climbing at wide open throttle to 10,500 feet. One of the goals for any new replacement fuel is to be completely transparent in its operation to the pilot. The ability to switch between the

left fuel tank with 100LL and the right with G100UL was the perfect situation to measure and document any differences between the two, using Garmin's G3X flight data recorder. Besides the extensive numerical flight data, I also used screen captures from the primary flight display and photography to document the results.

## PERFORMANCE, CONCLUSION

After 600-plus nautical miles and 3.5 hours, cruising at about 200 MPH at both 10,500 feet and 8500 feet altitudes, the observed differences between the operational characteristics of the two fuels were impossible to discern and even difficult to measure. At best, I can say that the slightly higher energy content and slower burn rate of G100UL produced about a 10- to 15-degree increase in exhaust gas temperatures (1430 degrees F to 1445 degrees F or a 1 percent change). Operationally, that difference is insignificant and equivalent to the slightest possible tweak in fuel mixture settings.

So far GAMI has the only FAA-approved and affordable high-octane unleaded avgas that's fully fungible with existing avgas. It is especially important in the Experimental Amateur-Built market for builders to understand that the operating limitations they establish for their aircraft can include FAA-approved unleaded alternative fuels. In my case, GAMI was more than happy to authorize my use of its approved data to use G100UL.

*The G3X engine display showed a roughly 10-degree increase in exhaust gas temps burning G100UL compared to 100LL. G100UL is distinguished visually from standard 100LL by color—which is light green instead of blue.*

